BEET (*Beta vulgaris*)
WILD BEET (*Beta vulgaris* ssp. *maritima*)
Cercospora Leaf Spot; *Cercospora beticola*

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**_Beta_ PIs from the USDA-ARS NPGS evaluated for resistance to _Cercospora beticola_, 2002.**

Thirty Plant Introductions (PIs) from the USDA-ARS National Plant Germplasm System (NPGS) (Garden Beet, Sugar Beet, Leaf Beet, Fodder Beet, and wild beet) were evaluated in an artificially produced epiphytotic environment (Ruppel, E.G., and J.O. Gaskill. 1971. Techniques for evaluating sugarbeet for resistance to *Cercospora beticola* in the field. J. Am. Soc. Sugar Beet Technol. 16:384-389) at the Crops Research Lab-Fort Collins Research Farm (CRL-FCRF) in CO. Randomized complete-block designs, with two replications were used to evaluate germplasm. Internal controls included a highly susceptible synthetic check, SP351069-0, and a resistant hybrid check, (FC504 X FC502/2) X SP6322-0. Two-row plots 4 m long, with 56 cm between rows and 20 to 25 cm within-row spacing, were planted on 3 May. The nursery was inoculated twice, on 12 Jul and 18 Jul. Visual evaluations on the plot with a disease index (DI) on a scale from 0 (no disease) to 10 (plant dead) at the CRL-FCRF were made on 5 Sept, 14 Sept, 19 Sept and 25 Sept, with the peak of the epidemic occurring around the last date. The field was sprayed three times with Betamix (13 and 21 Jun and 9 Jul) and twice with Upbeet (13 and 21 Jun) and Stinger (21 Jun and 9 Jul) to control weeds. The field was thinned by hand and irrigated as necessary.

The high daytime temperatures with lower nighttime temperatures in the summer of 2002, combined with very low moisture (drought conditions), contributed to a mild leaf spot epidemic. The *Cercospora* epidemic was slow to develop and had not become severe enough to rate until the middle of September. Disease severity peaked by late September, after which regrowth started to outpace new disease development, so that disease ratings remained constant or decreased after that rating. Since disease levels were very low at the first rating, with no significant difference between the lines, we show only the last three ratings. At our final evaluation (25 Sep), means of the resistant and susceptible internal control were 3.8 and 4.5 (scale of 0-10), respectively, across the nursery. In 2001 (17 Sep), these means were 5.0 and 6.4, respectively. Means of contributor lines in 2002 ranged from 2.7 to 5.7. An analysis of variance (PROC ANOVA - SAS) on the disease indices (visual evaluation scores) determined that there were significant differences among entries ($P \leq 0.05$) on the last three dates of evaluation. One accession (PI 540592) had a significantly lower rating than the susceptible control on all three rating dates. These data, and more information on the accessions evaluated, are available through the USDA-ARS GRIN database at http://www.ars-grin.gov/npgs.

| | | Identification | | Disease Index[1] | | |
|---|---|---|---|---|---|---|
| Entry | Donor's ID | subsp. | Origin | 14 Sep | 19 Sep | 25 Sep |
| PI 504181 | wild leaf beet | *vulgaris* | France | 4.0 | 4.0 | 4.0 |
| PI 504269 | wild beet | *maritima* | France | 3.5 | 3.5 | 4.0 |
| PI 504277 | wild beet | *maritima* | France | 3.0 | 3.5 | 4.5 |
| PI 504279 | wild beet | *maritima* | France | 3.5 | 4.0 | 4.0 |
| PI 518168 | IDBBNR 9600 | *vulgaris* | China | 2.5 | 3.0 | 4.0 |
| PI 518331 | IDBBNR 5825 | *maritima* | United Kingdom | 2.5 | 3.0 | 3.5 |
| PI 518404 | IDBBNR 5898 | *maritima* | Ireland | 3.5 | 3.5 | 3.5 |
| PI 518644 | IDBBNR 9604 | *vulgaris* | USA | 3.5 | 4.0 | 4.0 |
| PI 518645 | IDBBNR 9605 | *vulgaris* | USA | 4.0 | 3.5 | 3.5 |
| PI 535828 | Almamomo | *vulgaris* | Poland | 3.0 | 3.5 | 4.0 |
| PI 535830 | Poly Past | *vulgaris* | Poland | 4.0 | 4.0 | 4.0 |
| PI 535831 | Tytan Poly | *vulgaris* | Poland | 3.0 | 4.0 | 5.0 |
| PI 540570 | WB 824 | *maritima* | France | 3.0 | 4.0 | 4.0 |
| PI 540557 | WB 820 | *B. macrocarpa* | France | 3.0 | 4.0 | 4.5 |
| PI 540578 | WB 832 | *maritima* | France | 3.5 | 3.5 | 4.0 |
| PI 540582 | WB 836 | *maritima* | France | 2.8 | 3.0 | 4.5 |
| PI 540592 | WB 846 | *maritima* | France | 2.8 | 2.5 | 3.0 |
| PI 540595 | WB 849 | *maritima* | France | 3.5 | 4.0 | 4.0 |
| PI 540615 | WB 869 | *maritima* | France | 3.5 | 3.5 | 3.8 |
| PI 540637 | WB 891 | *maritima* | France | 3.5 | 3.0 | 3.5 |
| PI 540640 | WB 894 | *maritima* | France | 3.0 | 3.5 | 3.5 |
| PI 540641 | WB 895 | *maritima* | France | 3.5 | 3.5 | 3.5 |
| PI 540652 | WB 906 | *maritima* | France | 2.0 | 3.5 | 3.0 |
| PI 540661 | WB 915 | *maritima* | France | 2.5 | 3.5 | 3.0 |
| PI 540665 | WB 919 | *maritima* | France | 2.5 | 3.0 | 4.0 |
| PI 540690 | WB 944 | *maritima* | France | 3.8 | 3.5 | 4.0 |
| PI 540692 | WB 946 | *maritima* | France | 4.0 | 3.0 | 3.5 |
| PI 546504 | Turkestankaja | *vulgaris* | Russian Federation | 2.8 | 4.0 | 4.0 |
| PI 590695 | IDBBNR 4360 | *vulgaris* | USA | 2.0 | 3.0 | 3.0 |
| PI 614824 | Jaltuskovskaja 116 | *vulgaris* | Russian Federation | 4.0 | 4.0 | 4.5 |
| Leaf Spot Synthetic Susceptible Check[2] (931002) | | | | 4.0 | 4.0 | 4.5 |
| Leaf Spot Resistant Check[3] (821051H2) | | | | 3.0 | 3.0 | 3.5 |
| | | | $LSD_{0.05}$ | 1.00 | 1.34 | 0.91 |
| Trial Mean | | | | 3.2 | 3.5 | 3.9 |

[1]Disease Index is based on a scale of 0 (=healthy) to 10 (=dead).
[2]The Leafspot Susceptible Check is SP351069-0.
[3]The Leafspot Resistant Check is ((FC504CMS x FC502/2) x SP6322-0).